

# Bureau of Land Management

WIND RIVER/BIGHORN BASIN DISTRICT  
Worland Field Office

## **Wagonhound Allotment #00596**

### **Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management**

for

Public Lands Administered by the Bureau of Land Management in the  
State of Wyoming

Worland Field Office, Wind River/Bighorn Basin District, Wyoming

FY 2014/15



The BLM's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

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## **1.0 INTRODUCTION**

The Bureau of Land Management (BLM) grazing regulations at 43 CFR 4130.3-1(c) require that grazing permits issued by the BLM contain terms and conditions that ensure conformance with BLM regulations at 43 CFR 4180, which are the regulations under which the Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for Public Land Administered by the Bureau of Land Management in the State of Wyoming were developed. Recently, the Worland Field Office completed an assessment of the achievement of these standards on the Wagonhound Allotment No. 00596. The results of this assessment are presented in this report. This assessment will serve to inform the BLM's determination as to whether these standards are being met, and, if they are not met, whether existing grazing management practices contribute to their lack of attainment.

### **1.1 Standards**

The approved standards for rangeland health are as follows:

- Standard #1: Within the potential of the ecological site (soil type, landform, climate, and geology), soils are stable and allow for water infiltration to provide for optimal plant growth and minimal surface runoff.
- Standard #2: Riparian and wetland vegetation has structural, age and species diversity characteristic of the state of channel succession and is resilient and capable of recovering from natural and human disturbance in order to provide forage and cover, capture sediment, dissipate energy, and provide ground water recharge.
- Standard #3: Upland vegetation on each ecological site consists of plant communities appropriate to the site which are resilient, diverse, and able to recover from natural and human disturbance.
- Standard #4: Rangelands are capable of sustaining viable populations and a diversity of native plant and animal species appropriate to the habitat. Habitats that support or could support threatened species, endangered species, species of special concern, or sensitive species will be maintained or enhanced.
- Standard #5: Water quality meets State standards
- Standard #6: Air quality meets State standards

## 2.0 Affected Environment – Allotment Description, Resource Values, and Uses

### 2.1 Location and Land Ownership

Wagonhound Allotment is located in the western reaches of Hot Springs county-northwest of Thermopolis, Wyoming. The average elevation ranges from approximately 5400 feet to 6200 feet above sea level. The allotment encompasses approximately 12198 total acres including 8198 public acres and 4000 State land acres (Grass Creek RMP). The allotment is classified in the “I” (Improve) category.

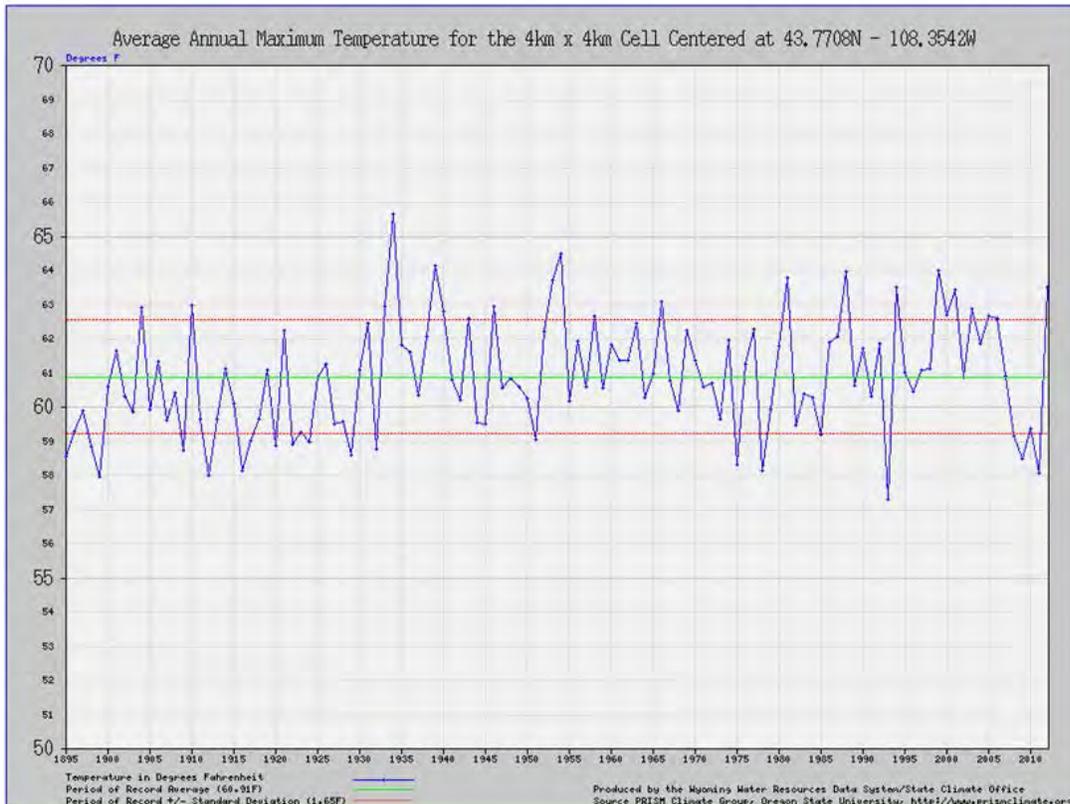
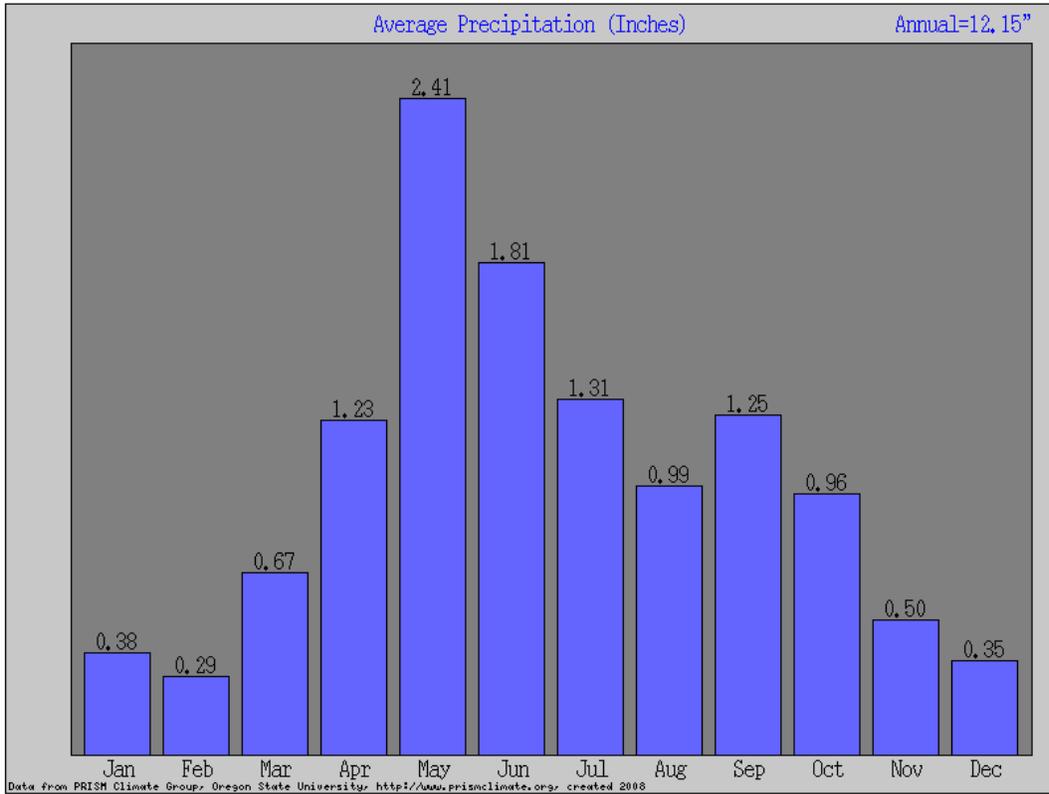
### 2.2 Climatic Features

Annual precipitation ranges from 10-14 inches per year. The normal precipitation pattern shows the least amount of precipitation in December, January, and February, increasing to a peak during the latter part of May. Amounts decrease through June, July, and August and then increase some in September. Much of the moisture that falls in the latter part of the summer is lost by evaporation and much of the moisture that falls during the winter is lost by sublimation.

Average snowfall exceeds 20 inches annually. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more than normal precipitation. Temperatures show a wide range between summer and winter and between daily maximums and minimums, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring. Winds are generally not strong as compared to the rest of the state. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 75 mph. Growth of native cool-season plants begins about April 15 and continues to about July 15. Cool weather and moisture in September may produce some green up of cool season plants that will continue to late October. The following information is from the “Thermopolis 2” climate station: Minimum Maximum 5 yrs. out of 10 between Frost-free period (days): 74 149 May 23 – September 16 Freeze-free period (days): 112 180 May 8 – October 1 Annual Precipitation (inches): 7.6 21.9 Mean annual precipitation: 12.35 inches Mean annual air temperature: 46.2 F (30.1 F Avg. Min. to 62.3 F Avg. Max.) For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/> website. Other climate station(s) representative of this precipitation zone include “Grass Creek 1E”, “Thermopolis”, Thermopolis 25NW”, “Buffalo Bill Dam” and “Black Mountain”.

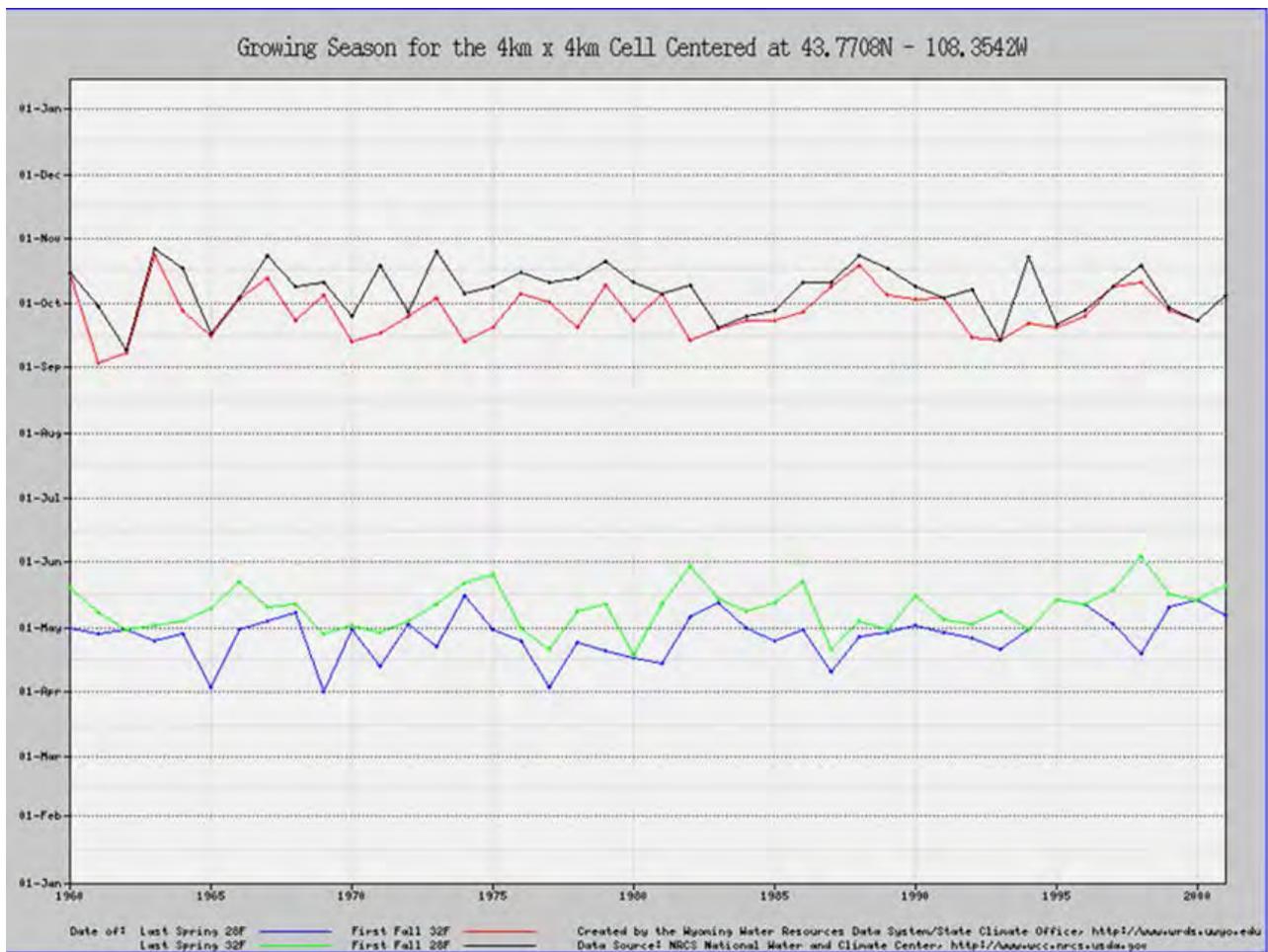
	<u>Averaged</u>
<i>Frost-free period (days):</i>	111
<i>Freeze-free period (days):</i>	146
<i>Mean annual precipitation (inches):</i>	14.00

**Figure PRISM Average Monthly Precipitation 30m Cell (43.78721;-108662)Wagonhound Allotment**



The maximum and minimum elevations for each allotment within the watershed were calculated along with the average slope given in percent rise for each 10 meter digital elevation grid. The Wagonhound allotment is at the middle elevations of the Cottonwood Creek watershed with the maximum, minimum, and average listed in the table below. The average slope is 17.1 percent and higher than adjacent allotments due to topography and geology of the watershed.

Allotment	Max Elev (ft)	Min Elev (ft)	Average Elev (ft)	Average Slope (% Rise) 10m
East Cottonwood	5270	4782	4974	8.4
West Cottonwood	6176	4942	5261	15.2
Wagonhound Bench	5769	5168	5374	7.1
Wagonhound	6229	5390	5715	17.1



## 2.3 Soils

The soils reflect the desert environment in which they formed. They are highly variable, reflecting differences in parent material (shale, sandstone and/or mixed alluvium), position on the landscape, slope and aspect. Soil depth ranges from 10 inches to over 60 inches with sandstone and soft shale bedrock common below the substratum. The soils typically have a light brown surface layer. Loamy and sandy surface textures dominate most of the landscape. The subsoil often reflects an increase in clay being expressed as an argillic horizon. Increases in sodium are also common being reflected as a natric horizon in the subsoil. Slopes range from 0 to 60 percent, but are generally less than 30 percent. The average slope for the allotment as calculated above is 17.1 percent.

The Wagonhound allotment is situated within the 10-14 inch Big Horn Basin (BH) Precip Zone as depicted by NRSC spatial data. Based on the soil survey data for Hot Springs County, the dominant soil units, soil map and amount of acres for the allotment is listed below:

Wagonhound Public Land Soils (May 2014)							
SOIL_NO	Map_Unit_Name	Surface_Texture	Slope	Ecological Site	Precip_Zone	Acres	
11	LARIMER LOAM	l	0-8	Ly	10-14	1073.55	
69	KIM LOAM	l	0-10	Ly(Cy)	10-14	229.14	
70	CADOMA SILTY CLAY LOAM	sicl	1-15	SU	10-14	14.43	
75	ARVADA(40%)-KIM ALKLI(35%) COMPLEX	fsl,l	0-10	SU,SL	10-14	39.6	
102	ROCK OUTCROP	ro	0-100	RO	5-19	198.57	
110	SHINGLE(50%)-Tassel(35%) COMPLEX	l,sl	3-45	SwLy,SwSy	10-14	99.89	
111	ROCK OUTCROP(30%)-SHINGLE(25%)-TASSLE(25%) COMPLEX	ro,l,sl	3-60	RO,SwLy,SwLy	10-14	3965.56	
243	KIM ALKALI(50%)-KIM(30%) LOAMS	l,l	0-6	SL,Ly(Cy)	10-14	162.8	
322	NIHILL(45%)-SHINGLE(30%) GRAVELLY LOAMS	grl,grl	3-45	Gr,SwLy	10-14	142.03	
345	VONA(45%)-OTERO(35%) SANDY LOAMS	sl,sl	3-15	Sy,Sy	10-14	95.36	
372	TASSEL(50%)-NELSON(25%) SANDY LOAMS	sl,sl	3-45	SwSy,Sy	10-14	191.33	
382	ROCK OUTCROP(40%)-TASSEL(40%) COMPLEX	ro,l	3-60	RO,SwSy	10-14	308.44	
448	TORRIFLUENTS SALINE	none	0-6	NONE	5-19	283.54	
490	SHINGLE(40%)-THEDALUND(35%) LOAMS	l,l	3-45	SwLy,Ly	10-14	159.75	
705	KIM(50%)-THEDALUND(30%) LOAMS	l,l	3-15	Ly(Cy),Ly	10-14	147.51	
720	BLAZON(45%)-ROCK OUTCROP(30%) COMPLEX	l,ro	3-60	SwLy,RO	10-14	382.91	
752	EPSIE SILTY CLAY LAOM	sicl	3-15	SU	10-14	672.98	
	sicl=silty clay, ro= rock outcrop, l= loamy, grl=gravel, c=clay, sl= sandy loam, fsl=fine sandy loam					Total	8167.39

There were 8 sites that were monitored within the allotment, six of which utilized the methodology described in *Interpreting Indicators of Rangeland Health, BLM Technical Reference 1734-6*, were relied upon in the analysis of the Wagonhound allotment. The assessments were conducted at two monitoring sites selected for this analysis. The table in vegetation monitoring (section 3.1) displays the soil characteristics for each assessment site.

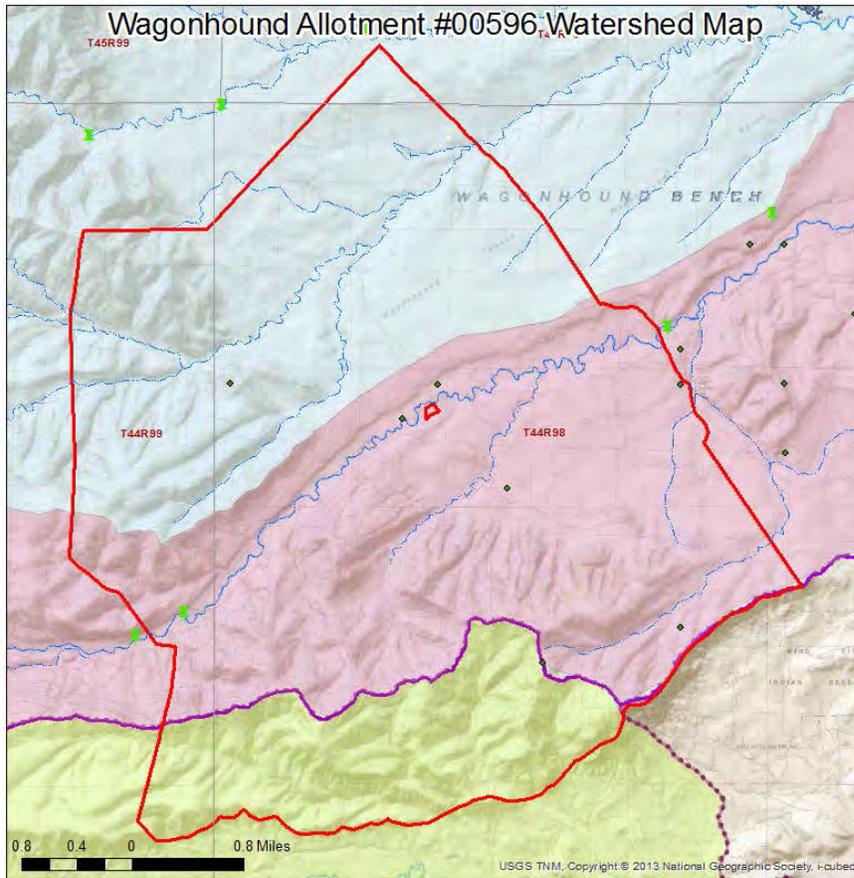
There are various dominant hydrologic group soils in the allotment. Group D type soils are those where the dominant soil type in the soil map unit contains very low infiltration rates, locally in the watershed these areas are located around rock outcrops and other shale type soils where infiltration rates are low or very low. The group C soils are from loamy range ecological sites in the watershed. The Wagonhound allotment is dominantly group C soils according to NRCS weighted average of the HUC 8 watershed level. There are also some group B soils along drainages and at the base of slopes of Cretaceous Sandstone outcrops.

## 2.4 Hydrology/Riparian

### 2.4.1 Surface Water/Watershed

The Wagonhound allotment falls mainly within the Cottonwood Creek sub-watershed with a portion (1961) acres in the Lower North Fork Owl Creek and 15 acres in the Upper Owl Creek sub-watershed. The amount of acres from the allotment as related to the 6th level sub-watershed as defined by the United States Geologic Survey (USGS) is found in the table below.

Sub-Watershed Name (HU12)	HUC 12	Acres	(mi)	Allot Acres	Allot mi <sup>2</sup>	% of Acres of Sub-watershed in the allotment
Cottonwood Creek- Twentyone Creek	100800070604	34550	53.98	5758	9	16.7
Wagonhound Creek	100800070605	28334	44.27	4374	6.8	15.4
Lower North Fork Owl Creek	100800070301	34435	53.8	1961	3.1	5.7
Upper Owl Creek	100800070305	46494	72.6	15	0	0
	<b>Total:</b>			12108	18.9	



The Cottonwood/Grass Creek watershed is located in Hot Springs and Washakie Counties. The watershed is comprised of the combined drainage basins of Cottonwood Creek and its main tributary, Grass Creek (of which the LU allotment is located). The main drainages in the western pastures are Grass Creek (tributary to Cottonwood Creek), that flows in an eastern direction, originating from the upper elevations of the Absaroka foothills. The majority of the main drainages are located on state or private land, with the exception of some meander segments that are located on public land throughout the reaches. There are several smaller perennial and intermittent tributaries that drain into Grass Creek that are located on public land segments. The Cottonwood/Grass Creek Watershed was recently studied by the Wyoming Water Development Commission (WWDC) in 2007 under a level I study and 2011 with a more detailed level II study. The study encompasses the hydrology of the creeks and summarizes the overall water use and availability of surface water in the watershed.

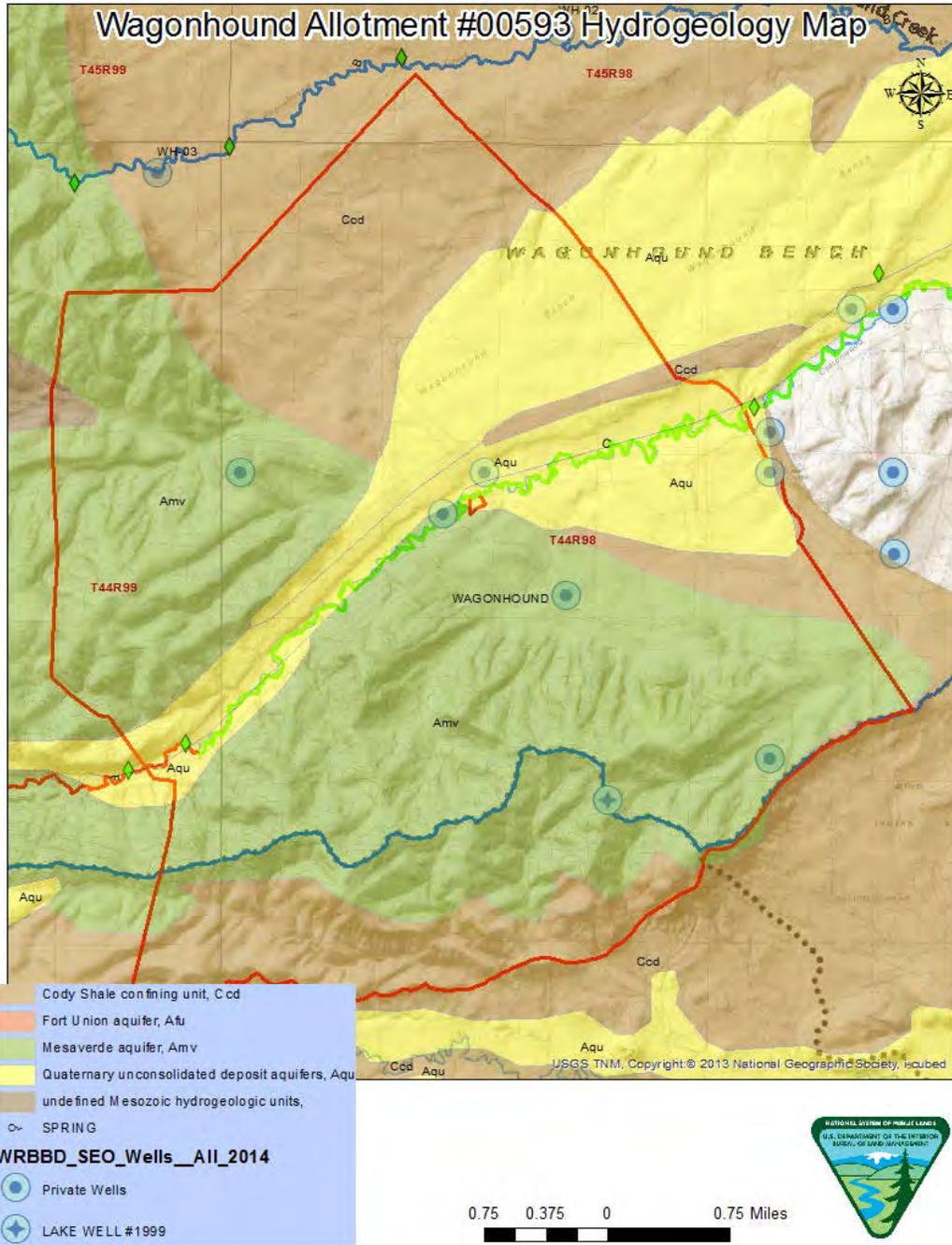
The economy of the watershed is based on agriculture (primarily cattle ranching and associated forage production) and oil and limited natural gas extraction at two larger (Hamilton Dome and Grass Creek) and a number of smaller still active fields (SEH, 2007 p.5).

The perennial stream reaches in the watershed (including the uppermost reaches of Cottonwood and Grass Creeks and their high elevation tributaries) are the result of higher precipitation (including greater snowpack) and greater groundwater recharge that, in turn, results in higher spring time runoff flows and sustain seep and spring discharge to these stream reaches through the summer and fall. As noted by local ranchers and other stakeholders in the watershed, the extent of the upper watershed perennial stream reaches has declined significantly over the course of the current drought, with many smaller springs ceasing to flow and greatly reduced flows in larger springs (SEH, 2007 p.32).

Cottonwood Creek flows through the allotment on private and stand land. There are 5 reservoirs located in the allotment. These reservoirs generally capture one time flow from runoff or snow melt. The 5 reservoirs were semi-functional and holding marginal amounts of water during the 2014 field inventory.

## **2.4.2 Groundwater**

The area is located in an erosive area with moderate amounts of runoff around areas of the Cretaceous Cody Shale Formation. Other portions of the allotment are other the Mesaverde Sandstone, Quaternary deposits on Wagonhound Bench and along some drainages. According to Wyoming State Engineers records of 2014 there are various wells shallow wells on state and private land. There is one well (Lake Well#1999) that is on public land that is 405 feet deep and used for stock water purposes. There are no springs on the GIS coverage layer, however small springs and seeps are present in similar areas throughout the watershed.



PERMIT	PRIORITY	TOWNSHIP	RANGE	SECTION	QTRQTR	APPLICANT	FACNAME	USES	YLDACT	S_DEPTH
P23100.OP	6/21/1950	44 N	98 W	17	SENW	CARRITHERS ASHLEY	LAKE HOUSE WATER #1	DOM_GW; STK	10	12
P23101.OP	6/21/1952	44 N	98 W	17	SENW	CARRITHERS ASHLEY	LAKE (CORRAL #1)	DOM_GW; STK	5	12
P144704.OW	4/10/2002	44 N	98 W	15	NENW	Legend Rock Resources, Inc.	WAGNER PIPELINE	IRR_GW; MIS	2500	0
P74722.OW	5/26/1987	44 N	98 W	17	SENW	HIGH ISLAND RANCH	HIGH ISLAND RANCH #1	DOM_GW; STK	2	12
P23099.OP	12/21/1952	44 N	98 W	22	SESW	CARRITHERS ASHLEY	SAND DRAW #1	STK	7.5	20
P87489.OW	3/30/1992	44 N	98 W	17	NWNW	NELSON GEORGE	NELSON #3	DOM_GW	25	5
P23097.OP	9/30/1967	44 N	98 W	18	NWNW	CARRITHERS ASHLEY	CHARLES W LAKE #1	STK	5	75
P23098.OP	12/21/1952	44 N	98 W	16	SWSW	CARRITHERS ASHLEY	CHARLES W LAKE #2	STK	7.5	50
P9737.OP	11/15/1966	44 N	98 W	28	NENW	USDI - BLM	LAKE WELL #1999	STK	7.5	405
P152343.OW	6/2/2003	44 N	98 W	15	NENW	Legend Rock Resources, Inc.	ENL WAGNER PIPELINE	MIS	0	0

Ground-water recharge in arid and semi-arid regions has generally been viewed as the sum of several different distinct pathways including mountain-block recharge, mountain-front recharge, spatially distributed recharge, and ephemeral stream channel recharge. Recent research has expanded this view to include the mediating role of vegetation (i.e. water use by vegetation), and the greater role of ephemeral stream channel recharge in basin floors (EPA, 2008 p.22). The ground-water recharge for this watershed is likely in the form of ephemeral stream channel recharge. In this allotment there has been historic ground water recharge from the disposal of produced ground water associated with oil fields that are located above the allotment. The produced water historically recharged aquifers along the drainages of Cottonwood Creek. Recently due to re-injection practices in the oil field the amount of discharged water has declined in the area.

### 2.4.3 Water Quality (Surface)

Cottonwood Creek and adjacent upland drainages is the area in consideration for this standard. The data is presented in 3.4.3.

*2012 WY Integrated Report*

Bighorn River Basin (continued)					
305(b) Identifier	Waterbody	Location	Class	Miles/Acres	Uses Supported
Cottonwood Creek	WYBH100800070609_01	From the confluence with the Bighorn River upstream to the confluence with Wagonhound Creek	2AB	29.5 mi.	Cold Water Fishery, Aquatic Life other than Fish, Wildlife, Agriculture, Industry

The associated beneficial uses for class 2AB streams are found in the table below. Cottonwood Creek in the Wagonhound allotment is given the same rating of 2AB for the reaches upstream of the Wagonhound confluence. This is the rating given by the DEQ following a use attainability analysis and public comments. DEQ defines “these streams support drinking water, game fish, aquatic life, recreation, wildlife, agriculture, industry, and provide scenic value throughout portions of the year.

Wyoming DEQ Surface Water Use Class and TMDL Summary

Surface Water Classes	WY DEQ Use Designations									
	Drinking Water	Game Fish	Non-Game Fish	Fish Consumption	Other Aquatic Life	Recreation	Wildlife	Agriculture	Industry	Scenic Value
2AB	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2C	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3B	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes

### 2.4.4 Riparian

There are no riparian areas on public land within the allotment. The riparian areas are found within the Cottonwood Creek floodplain area that is dominantly private and state land.

## 2.5 Upland Vegetation

The native plant species identified included Needle and thread, Sandberg bluegrass, Blue grama, Textile Onion, Sego lily, Plains pricklypear cactus, Aster, Wyoming big sagebrush, biological crusts, lichens, Alkali sacaton, Bluebunch wheatgrass, phlox (Phlox spp.), Western wheatgrass, Woody Aster, Bottlebrush squirreltail, Scarlet globemallow, carex, vetches, prairie junegrass, rabbit brush, black sage, rose pussytoes, greasewood, junipers, winterfat, six weeks fescue, broom snakeweed, fringed sagewort, wildrye, and gardeners saltbush. This list identifies the those species within transects or noted within areas of the transects but does not ensure a complete list of every plant within the allotment.

## 2.6 Invasive Species

Weed species noted in the inspections of the allotment during the 2014 year include saltcedar and cheatgrass. Records indicate that saltcedar, canda thistle and and Russian knapweed have been treated in the past. These treatments (2004, 2008, and 2009) have primarily occurred in areas disturbance with associated produced/discharge water for oil wells.

## 2.7 Livestock Grazing Management

Currently there is no active grazing permit to authorize grazing on public lands of the allotment. The most recent grazing permit for the allotment appeared as follows:

	Livestock Number/kind	Grazing Begin	Grazing End	% PL	AUMS
Wagonhound No. 00596	330 Cattle	4/24	5/31	72	297
	345 Cattle	6/1	6/26	72	212
	50 Cattle	7/15	2/28	72	271
	17 Cattle	12/16	2/28	100	42

The calculated livestock grazing use was compiled from paid grazing bills, notes and actual use reports.

Wagonhound Allotment			
Year	AUMS		
	Spring	Fall	Total
1995	422	42	464
1996	434	382	816
1997	470	42	512
1998	408	398	806
1999	448	355	803
2000	365	42	407
2001	424	226	650
2002	373	172	545
2003 undetermined	---	---	---
2004-2005	0	0	0
<b>Average use - doesn't include non-use years</b>	<b>418</b>	<b>207</b>	<b>625</b>

The grazing permit allowed for 509 Spring AUMs and 313 fall use AUMs by cattle. From 1995 through 2002 the average use was 418 AUMS or 82% of Spring AUMs and 207 AUMs were averaged in the non-growing season which accounts for 66%. The annual average use was 625 or 76% of the permitted use.

## 2.8 Wildlife

The Wagonhound allotment provides wildlife habitats, specifically forage and cover needs, for several big game, none game, BLM sensitive and migratory birds species, some seasonally and some yearlong. Provided are yearlong and seasonal habitats for numerous species like mule deer and pronghorn antelope, and sagebrush obligate bird species like the sage-grouse, sage thrasher, sage and Brewer's sparrow. The primary vegetative communities providing wildlife forage and cover needs are the sagebrush/bunchgrass communities and juniper/limber pine breaks. These sagebrush communities are important to wintering mule deer, antelope and wintering and nesting sage grouse, as well as other sagebrush obligate passerines. Wintering big game and sage-grouse depend on the sagebrush plants for forage, and the avian sagebrush obligates depend on both the sagebrush and standing herbaceous residue for nesting cover. All of this allotment is mapped as crucial mule deer winter range, but both mule deer and antelope could be expected in smaller numbers year around, (see Wildlife Map). The juniper/limber pine breaks provide hiding and thermal cover for mule deer, and the trees also provide valuable nesting habitat and forage in the form of cones and berries, for species like Pinyon jays, Townsend solitaire and mountain blue birds.

## 2.9 Threatened, Endangered, Candidate, or Sensitive Species

The sagebrush/bunchgrass community mentioned above, in addition to providing big game winter range, provide winter, nesting and early brood rearing habitat for sage-grouse as well as breeding, nesting and foraging habitat for sagebrush obligate passerine species like the sage thrasher, sage and Brewer's sparrow. All but a small southeastern portion of this allotment falls within Core sage-grouse habitat (see Wildlife Map), and there is one large sage-grouse winter concentration area identified in the east central portion of this allotment and Wagonhound Bench allotment to the east. Sage-grouse wintering habitats have been documented through inventory and monitoring efforts, but breeding, nesting and late brood rearing habitats have not been. However in an analysis of sage-grouse studies conducted in 7 areas in Wyoming since the mid-1990s, Holloran and Anderson (2005) found that 45% of nests were located within 2 miles (3km) of the lek where the hen was bred, and 64% of the nests were within 3 mile (5 km) of the lek. There are no known occupied leks within this allotment, but there are 3 occupied leks within 1.5 miles or less, and another 2 more within 7 miles or less, of the allotment boundary. Female sage-grouse from at least the closest 3 occupied leks could be using suitable sagebrush habitats within this allotment for nesting habitat. Male sage-grouse lek attendance, as well as the peak and low male counts for all 5 of these leks is provided in the Section 3.5 Table\_\_ below. Three sage-grouse habitat assessments were conducted within representative sage-grouse habitats in this allotment, where sage-grouse habitat data was collected, (see Wildlife Map \_ for transect locations). Data from these assessments is summarized in Section 3.5 Table\_\_.

Exact movements between seasonal habitats have not been documented but anecdotal observations lead biologist to believe that these sage-grouse, post hatch, migrate up in elevation as green-up progresses, into upper Cottonwood and Owl creeks to the west and south. An analysis of sage-grouse nest site selection from 7 study areas in Wyoming indicates that residual grass height should be a minimum of 3.9 inches (10 cm) in Wyoming big sagebrush dominated sites (Holloran et al. 2005) compared to 7 inches (18 cm) minimum live perennial herbaceous vegetation height recommended by Connelly et al. (2000) in breeding habitats. Hens nesting in these cover conditions experience higher nest success rates than those nesting under inferior cover conditions (DeLong et al. 1995, Holloran et al. 2005). An idea of available nesting cover in the form of standing herbaceous residue can be observed in the sage-grouse habitat assessment transect data, (height and % cover of residual herbaceous) and nesting habitat monitoring photos, (see section 3.5).

There are no known threatened or endangered wildlife species within these allotments, but the sage-grouse listed as a Candidate species, sage thrasher, sage and Brewer's sparrow, are all Wyoming BLM sensitive species. And there are several other raptor and migratory bird species inhabiting these allotments, at least seasonally, that were not mentioned or analyzed.

### 3.0 Summary of Monitoring Data / Assessments

#### 3.1 Monitoring Data

In the summer of 2014, 8 vegetation monitoring sites were selected in the allotment as part of the Rangeland Health Assessment process. Complimenting those locations were additional photo-points and an additional cover transect. Ecological site, soil type, vegetative community, topography, location of water sources, and livestock grazing history are some of the factors that were considered in the selection of these monitoring sites.

Line intercept cover transects were completed in each monitoring site. A summary of the cover data collected from each monitoring site is shown below:

<b>Vegetation Monitoring Data</b>					
<b>Monitoring Site</b>	<b>Ecological Site</b>	<b>Basal Veg. Cover</b>	<b>Litter</b>	<b>Bare Ground</b>	<b>Brte presence ((hits/transect pts)*100)</b>
<b>T438</b>	SwLy 10-14		34.8%	7.6%	0
<b>Section 21</b>	Sandy 10-14		56.2%	21.4%	0
<b>Bull Pasture</b>	SwSy 10-14		50%	20.5%	0
<b>Step pt. bl reservoir</b>	Ly 10-14		17%	24%	6.4
<b>447A</b>	SwLy 10-14		38.8%	10%	0
<b>447B</b>	SwLy 10-14		44%	15.5%	0
<b>3X3 Section 30</b>	SwLy 10-14		47.5%	4.9%	0
<b>Crested Cover</b>	Loamy 10-14		42.3	21.9%	0

Cheatgrass presence is derived from total “hits” on cheatgrass, canopy or basal, throughout the transect. It is a representation of the amount times the plant was encountered along a transect in relation to the amount of points observed on the transect.

Rangeland Health Assessments were conducted at the monitoring sites by an interdisciplinary team on using the 17 Indicators of Rangeland Health as described in BLM Technical Reference 1734-6. Field observations were compared to the Reference Sheet for the SwLy 10-14, the Sandy 10-14, and the SwSy 10-14. This was done to determine departures from normal-as prescribed in the reference sheet. Individual ratings to the Rangeland Health Indicators are displayed for each monitoring site below.

Rangeland Health Indicators						
Indicator	Departure from Reference Sheet					
	T438	Section 21	Bull Pasture	447A	447B	3x3 Section 30
1. Rills	NS	NS	NS	NS	NS	NS
2. Water-flow patterns	NS	ME	M	SM	SM	NS
3. Pedestals and/or terracettes	SM	M	M	NS	SM	NS
4. Bare ground	NS	SM	NS	NS	NS	NS
5. Gullies	NS	M	NS		NS	SM
6. Wind-scoured, blowouts, and/or deposition areas	NS	NS	SM	NS	NS	NS
7. Litter movement	NS	M	SM	NS	SM	NS
8. Soil surface resistance to erosion	NS	NS	NS	NS	NS	NS
9. Soil surface loss or degradation	NS	SM	SM	NS	NS	NS
10. Plant community composition and distribution relative to infiltration	NS	M	NS	NS	SM	NS
11. Compaction layer	NS	NS	NS	NS	NS	NS
12. Functional / structural groups	SM	M	M	NS	SM	NS
13. Plant mortality / decadence	SM	NS	NS	NS	NS	SM
14. Litter amount	NS	SM	NS	NS	NS	NS
15. Annual production	NS	NS	NS	NS	NS	NS
16. Invasive plants	SM	ME	ME	SM	SM	SM
17. Reproductive capability of perennial plants	NS	NS	NS	NS	NS	NS
<b>Indicator Summary</b>						
Soil / Site Stability ( <i>Indicators 1-9, 11</i> )	NS	SM	SM	NS	NS	NS
Hydrologic Function ( <i>Indicators 1-5, 8-11, 14</i> )	NS	M	SM	NS	NS	NS
Biotic Integrity ( <i>Indicators 8-9, 11-17</i> )	NS	M	M	NS	NS	NS
N-S None to Slight    S-M Slight to Moderate    M Moderate    M-E Moderate to Extreme    E-T Extreme to Total						

### 3.2 Soils and Site Stability

Data collected for the Rangeland Health Assessments were used to evaluate soil and site stability on the allotment. Standard 1 for Healthy Rangelands was evaluated based on the attribute ratings for Soil and Site Stability and Hydrologic Function using rangeland health indicators 1 through 11 and 14. In total of the 6 reference sites, 4 were rated as none-slight departure and 2 sites were rated as slight to moderate departure. All of the public land acres are currently meeting the definition as follows “Within the potential of the ecological site (soil type, landform, climate, and geology), soils are stable and allow for water infiltration to provide for optimal plant growth and minimal surface runoff.”

## 3.3 Hydrology

### 3.3.1 Surface Water

#### Surface Flow

The Cottonwood Creek drainage has headwaters located further to the west and the flow in the creek through the allotment is typical of higher elevation watersheds with peak flows occurring in May through June following snow melt. During the other months of the year the flow is augmented from discharge of produced water from Hamilton Dome oil field downstream in the allotment. For full details of flow and flow conditions see the Level I and Level II watershed study as provided in the reference section.

“The stream reaches and tributaries in the Plains region of the watershed typically range from intermittent in the mid-elevations to ephemeral in the lower elevation (eastern) portion of the watershed. Ephemeral streams are defined herein as those streams/reaches that flow only in response to direct precipitation events, and where any groundwater inflows are insufficient to sustain streamflow due to losses from evaporation, transpiration, and seepage. The hydrologic behavior of intermittent streams/reaches is transitional between perennial and ephemeral stream hydrology. Typical intermittent streams include Prospect Creek and Wagonhound Creek; ephemeral streams include Boulder Gulch, Spring Gulch, Lester Draw and Chimney Gulch, all tributary to lower Cottonwood Creek below the Grass Creek confluence.”(Note that there is another Spring Gulch tributary to Grass Creek; that stream is perennial to intermittent.) (SEH, 2007 p. 32).

#### Rosgen Types-Channel Characteristics

As part of the Level I inventory in 2006 channel cross sections, channel Rosgen Types, and other channel information were determined on the main reaches in an effort to determine the watershed health, functionality, and sources of impairments or disturbances that have altered stream channels and runoff conditions.

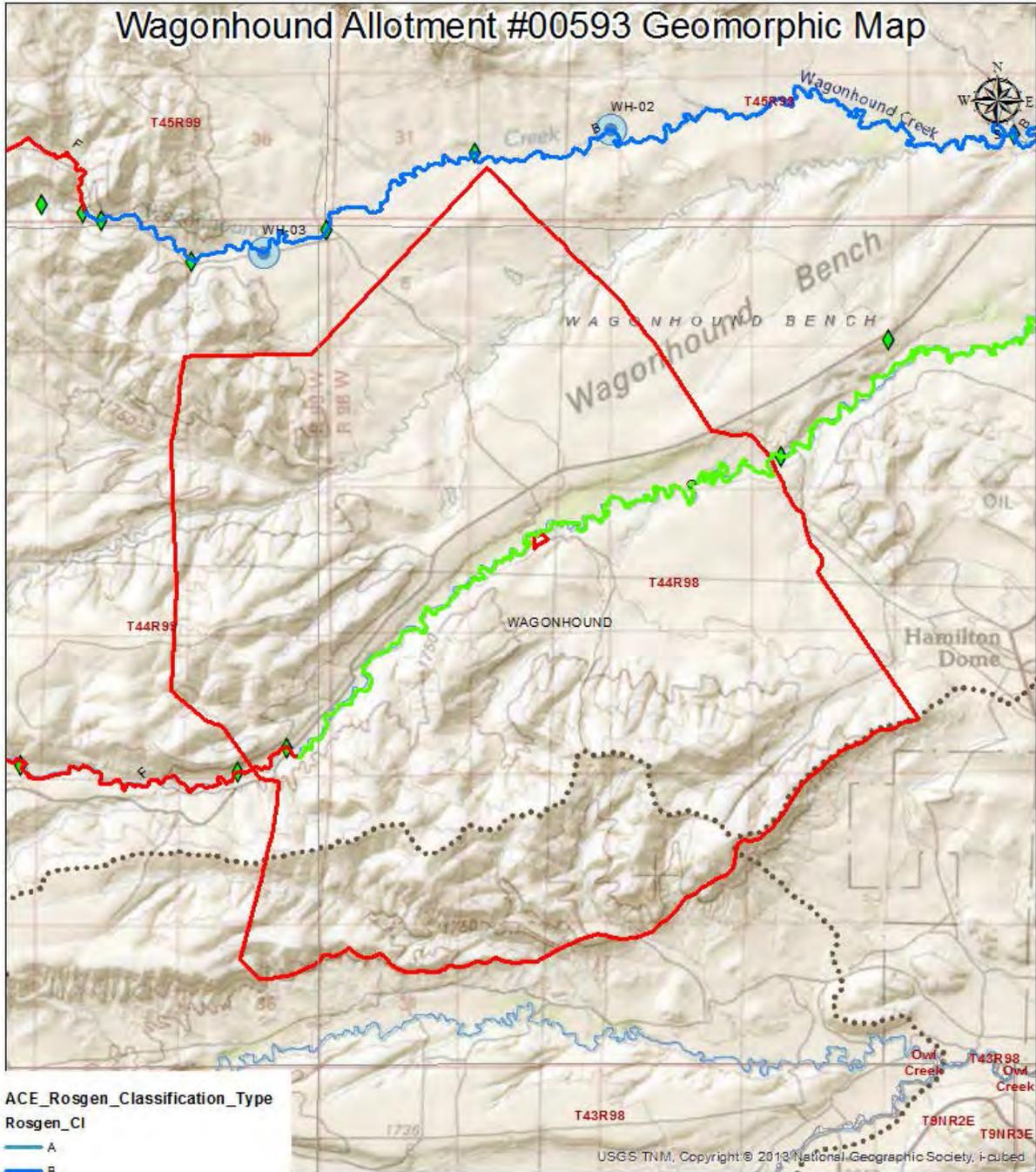
The following information was taken from this report for the West Cottonwood allotment. The map and following chart indicate the Rosgen channel stream type and other information relevant to the allotment. Sites PC-01 and WH-01 are within the allotment.

The purpose of the Level II classification was to obtain more detailed morphological description of the Wagonhound Creek, Prospect Creek, and Spring Gulch sub-watersheds. These areas were identified during the initial Level I investigation as potentially being impaired and being locations of potential watershed improvement projects.

Cottonwood Creek is considered a C type stream with access to the floodplain. Other channels are B, E, and F type channels as described in the chart below.

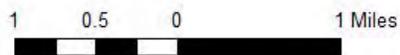
“Many of the first-order tributaries in the basin and in upland areas of the allotment can be classified as G-Type channels, or gullies. These channels are highly erosive, generate high sediment volumes, and can result in the loss of productive lands and destabilize upland conditions (Figure 2.4.-13 – Tributary to Wagonhound Creek – (Type G Channel). Observation of many of these channels indicates that while the major stream channels appear to have achieved a level of stability, the upper reaches of the watershed are still suffering a level of destabilization. These channels could be forming in response to one or more of numerous stimuli including but not necessarily limited to: channel realignment (straightening), road and culvert construction, rangeland management practices, or base-level lowering associated with main channel incision.” (SEH,2007 p.44).

# Wagonhound Allotment #00593 Geomorphic Map



ACE\_Rosgen\_Classification\_Type  
Rosgen\_CI

- A
- B
- C
- E
- F
- G
- ◆ ACE\_Channel\_Photos
- ACE\_Cross\_Sections\_Level\_2



**Rangeland Health17 Indicators**

The hydrologic and soil rangeland health indicators as outlined and discussed in the table above were assessed to determine current conditions in the allotment related to runoff and soil water retention. The overall ratings from 3 monitoring sites are found in the table in section 3.1. Two sites recorded a slight to moderate departure from reference conditions; the other four sites had an overall hydrologic rating of none to slight.

Generally in areas where a moderate or greater departure was referenced for soil or hydrologic function, these areas are not currently meeting standards. The causal factors are described below.

**Human Influence**

Anthropogenic uses and activities on the landscape can have significant impacts – both adverse and beneficial– on water quality and the health of a watershed. Human-related disturbances are numerous and include livestock grazing, land clearing, mining, timber harvesting, ground- water withdrawal, stream flow diversion, channelization, urbanization, agriculture, roads and road construction, off-road vehicle use, camping, hiking, and vegetation conversion. Biological stressors include habitat loss, alteration, effluent discharge, and degradation from decline in water quality, and changes in channel and flow characteristics (EPA, 2008 p.65).

**Figure 1- From SEH,2007 Cottonwood Level I Watershed Study**

**Table 2.4-4  
Summary of Geomorphic Impairments**

Stream	Channel Degradation <sup>1</sup>	Bank Erosion <sup>2</sup>	Range Management <sup>3</sup>
Cottonwood Creek	✓	✓	✓
Grass Creek			✓
Prospect Creek	✓	✓	✓
Wagonhound Creek	✓	✓	✓
Spring Gulch	✓	✓	✓

<sup>1</sup> Channel Degradation: Channel downcutting, headcutting, gully formation

<sup>2</sup> Bank Erosion: Channel widening, channel migration, irrigation diversion abandonment

<sup>3</sup> Range Management: Riparian vegetation, erosion impacts, bank erosion

The table below as provided below(EPA,2014 and Rosgen 1994,1996) represent management interpretations by stream type, sensitivity to disturbance, recovery potential, sediment supply, streambank erosion potential, and vegetation controlling influence factors as related to channels in the allotment. The segments in the allotment are F4 and E5 types that have extreme and very high rating sensitivity to disturbance that has historically occurred in the allotment.

Table 3. Management interpretations by stream type (Rosgen 1994, 1996)

Stream Type	Sensitivity to Disturbance <sup>a</sup>	Recovery Potential <sup>b</sup>	Sediment Supply <sup>c</sup>	Streambank Erosion Potential	Vegetation Controlling Influence <sup>d</sup>
A1	very low	excellent	very low	very low	negligible
A2	very low	excellent	very low	very low	negligible
A3	very high	very poor	very high	very high	negligible
A4	extreme	very poor	very high	very high	negligible
A5	extreme	very poor	very high	very high	negligible
A6	high	poor	high	high	negligible
B1	very low	excellent	very low	very low	negligible
B2	very low	excellent	very low	very low	negligible
B3	low	excellent	low	low	moderate
B4	moderate	excellent	moderate	low	moderate
B5	moderate	excellent	moderate	moderate	moderate
B6	moderate	excellent	moderate	low	moderate
C1	low	very good	very low	low	moderate
C2	low	very good	low	low	moderate
C3	moderate	good	moderate	moderate	very high
C4	very high	good	high	very high	very high
C5	very high	fair	very high	very high	very high
C6	very high	good	high	high	very high
D3	very high	poor	very high	very high	moderate
D4	very high	poor	very high	very high	moderate
D5	very high	poor	very high	very high	moderate
D6	high	poor	high	high	moderate
DA4	moderate	good	very low	low	very high
DA5	moderate	good	low	low	very high
DA6	moderate	good	very low	very low	very high
E3	high	good	low	moderate	very high
E4	very high	good	moderate	high	very high
E5	very high	good	moderate	high	very high
E6	very high	good	low	moderate	very high
F1	low	fair	low	moderate	low
F2	low	fair	moderate	moderate	low
F3	moderate	poor	very high	very high	moderate
F4	extreme	poor	very high	very high	moderate
F5	very high	poor	very high	very high	moderate
F6	very high	fair	high	very high	moderate
G1	low	good	low	low	low
G2	moderate	fair	moderate	moderate	low
G3	very high	poor	very high	very high	high
G4	extreme	very poor	very high	very high	high
G5	extreme	very poor	very high	very high	high
G6	very high	poor	high	high	high

- a Includes increases in streamflow magnitude and timing and/or sediment increases.  
b Assumes natural recovery once cause of instability is corrected.  
c Includes suspended and bedload from channel derived sources and/or from stream adjacent slopes.  
d Vegetation that influences width/depth ratio-stability.

### **3.3.2 Ground Water**

There are three types of ground-water that occur in the watershed in the form of springs, alluvial aquifers, and bedrock aquifers.

The estimated depth to groundwater is estimated to be greater than 100 feet in upland areas. The amount of evaporation s indicated in the Wyoming Climate Atlas is 26 inches per year for the Thermopolis area. This exceeds the annual precipitation of 10-12 inches per year, and therefore the amount of groundwater recharge into the primary Mesaverde Aquifer is minimal. The Cody Shale formation is considered a confining unit and not a primary aquifer. The only other potential recharge is along Quaternary aquifers located beneath stream channels through infiltration following storm events.

There have been a total of ten water developments that are presented in section 2.3.2. The majority of these wells are shallow wells that are for livestock and domestic use. The well on public land was inventoried in the field season of 2014. There is however significant ground water development and depletion in the adjacent Hamilton Dome oil field located to the south of the allotment. This produced ground water has been discharged since the inception of the oil field in the early 1900's. This water is as an oil field by-product with the volume, location, and water quality permitted through the WYPDES (Wyoming Pollutant Discharge Elimination System) discharge permit with the Wyoming DEQ.

### **3.3.3. Water Quality (Surface)**

There is no recent BLM water quality data for the allotment. The most recent available data is from the DEQ below.

DEQ Data

The following was taken from the draft WYDEQ,2014 305b water use report p.34.

“Cottonwood Creek’s headwaters are situated in the southeastern foothills of the Absaroka Mountains. WDEQ (2002) monitored Cottonwood Creek in 1998 and noted that there were elevated concentrations of chloride, selenium and sulfate. The report also that there was in-stream habitat degradation, including the presence of a wide and shallow channel and fine sediment aggradation and that riparian vegetation was in poor condition . The Hamilton Dome Oil Field discharges produced water into several unnamed tributaries to Cottonwood Creek. This treated water resulted in exceedances of the chronic chloride and selenium criteria and non-support of the cold water game fish and aquatic life other than fish uses. Cottonwood Creek (WYBH100800070609\_01) was therefore added to the 303(d) List in 2004 from the confluence with the Bighorn River upstream to the confluence with Wagonhound Creek. The oil field discharge is critical to maintaining intermittent flows that provide water for irrigation and wildlife. In addition, the facility is an important part of the local economy and the facility upgrades that would be necessary to meet WDEQ’s standards would result in the closure of the facility. Therefore, site specific criteria of 43 ug/L for selenium and 860 mg/L for chloride were adopted as part of a UAA for Cottonwood Creek that was approved by USEPA in 2008. Cottonwood Creek was subsequently removed from the 303(d) List in 2008 and placed in category 2 because cold water fishery and aquatic life other than fish uses were determined to be fully supported.”

The most significant water quality issue for groundwater use in the watershed appears to be the potential for salt impacts to less resistant species and salt accumulation in inadequately drained soils. These potentials are related to the relatively high levels of sulfate, TDS and specific conductance present in many of the samples summarized in Table 2.6-3. Levels of Selenium discharged from Hamilton Dome into Cottonwood Creek has historically been an issue with water quality with TMDL levels established and analyzed by the DEQ as part of their WYPDES discharge permit (SEH,2007).

### 3.3.4 Riparian

There are no riparian areas on public land in the allotment. This standard is considered not applicable for the Wagonhound allotment.

### 3.4 Upland Vegetation

Data from the line intercept cover transects, the 17 Indicators of Rangeland Health, and other field observations were used to evaluate the vegetative community on the allotment. Standard 3 for Healthy Rangelands was evaluated based on the attribute ratings for Biotic Integrity using rangeland health indicators 8 through 9, and 11 through 17.

The vegetative community, ground cover, and soil surface attributes for the assessment sites were noted, measured and compared to the ecological site description (ESD) and corresponding reference sheet. The following sites were compared to the Shallow Loamy 10-14 inch precipitation zone (R032XY362W Y).

Site T438  
Site 447A  
Site 447B  
3X3 Section 30

The Historic Climax Plant Community for this ecological site is a Bluebunch wheatgrass/Rhizomatous wheatgrass/Needleandthread plant community. This community would be dominated by cool season grasses (75%) followed by a nearly even balance of woody species (15%) and forbs (10%). With moderate continuous season long grazing or extended droughts a transition from HCPC to a Perennial Grass/Mixed shrub state may occur. This state is dominated by cool season grasses but shrubs, blue grama, and cactus may have invaded but only in small areas. Bluebunch may have decreased and species like Indian ricegrass (if it did occur on site) may be in protected areas only. The state has a hydrologic, soil, and biotic community that is stable and intact. From this state, with frequent and severe grazing, lack of fire, extended droughts or a severe grazing in conjunction with wildfire the vegetative state can be converted to a mixed shrub/bare ground community, a blue grama sod community, a salt tolerant shrub/rhizomatous wheatgrass community or a Salt tolerant shrub/bare ground community.

States beyond the Perennial grass/Mixed shrub community are likely to have a biotic, soil, and hydrologic function that is at risk or not functioning. Herbaceous production will decline, the undesirable species increase as the desirable species decrease, and the ability to move towards HCPC is diminished without mechanical treatments, reseeding efforts, soil remediation efforts, and intense grazing management.

#### Site T438

The data collected at this site indicates that this site has characteristics of a Perennial Grass/Mixed Shrub Plant Community. The attribute rating justification for the Biotic Integrity at this assessment was "None to Slight." The functional/structural groups are slightly reduced/altered and the plant diversity is still adequate. The dominant cool season grass expected for this site is present and is primarily made up of bluebunch wheatgrass. Perennial forbs were noted in the assessment area as a minor component which is expected. The two main woody species on site are sagebrush and black sagebrush. Blue grama and cactus are also present on site (expected for the community) in small areas. Biological crusts were common in the area and readily observed within the transect. Plant mortality/decadence was considered slight to moderate because of the decadence in the bluebunch wheatgrass plants-old growth amongst the living leaves because of lack of disturbance. The percent litter was within expected at the transect site as was the amount of bare ground. The invasive plants indicator number 16 was rated as slight-moderate. While no cheatgrass was documented within the transect it and cactus was noted as being in the area in small locations and low frequency.



T438

### Site 447A

The data collected at this site indicates that this site has characteristics of a state in transition at HCPC to a Perennial Grass/Mixed Shrub Plant Community. The attribute rating justification for the Biotic Integrity at this assessment was “None to Slight.” The functional/structural groups are intact and represent that which would be expected according to the ESD. The dominant cool season grass expected for this site is present and is primarily made up of bluebunch wheatgrass. Perennial forbs were noted in the assessment area and were observed as slightly higher than expected. The main woody species on site is sagebrush and is near what would be expected for the site. Blue grama and cactus are also present on site (expected for the community) in small areas. Biological crusts were common in the area and readily observed on the transect. The percent litter was within expected at the transect site as was the amount of bare ground. The invasive plants indicator number 16 was rated as slight-moderate. While no cheatgrass was documented within the transect it was noted as being in the area in small areas of disturbance.



T447A

### Site 447B

The data collected at this site indicates that this site has characteristics of a Perennial Grass/Mixed Shrub Plant Community. The attribute rating justification for the Biotic Integrity at this assessment was “None to Slight.” The functional/structural groups are slightly reduced/alterd and the plant diversity is still adequate. The dominant cool season grass expected for this site is present and is primarily made up of bluebunch wheatgrass, western wheatgrass, junegrass, and needle-and-thread greass. Perennial forbs were noted in the assessment area as a minor component which is expected. The main woody species on site is sagebrush. Blue grama and cactus are also present on site (expected for the community) in small areas. Biological crusts were common in the area and readily observed on the transect. The percent litter was within expected at the transect site as was the amount of bare ground. The invasive plants indicator number 16 was rated as slight-moderate. While no cheatgrass was documented within the transect it and cactus was noted as being in the area in small locations and low frequency.



**T447B**

### **Site Section 30 3X3**

The data collected at this site indicates that this site has characteristics of a state in transition at HCPC to a Perennial Grass/Mixed Shrub Plant Community. The attribute rating justification for the Biotic Integrity at this assessment was “None to Slight.” The functional/structural groups are intact and represent that which would be expected according to the ESD. The dominant cool season grass expected for this site is present and is primarily made up of bluebunch wheatgrass. Perennial forbs were noted in the assessment area and were observed as slightly lower than expected. The main woody species on site is sagebrush and is near what would be expected for the site. .

Biological crusts were common in the area and readily observed within the transect. The percent litter was within expected at the transect site as was the amount of bare ground. The invasive plants indicator number 16 was rated as slight-moderate. While no cheatgrass was documented within the transect, it was noted as being in the area in small areas of disturbance.



Section 30 3X3

### Section 21 Cover

This transect was compared to the Sandy 10-14 inch precipitation zone (R032XY350+WY). The Historic Climax Plant Community for this ecological site is a Needleandthread/Indian ricegrass plant community. This community would be dominated by cool season grasses (75%) followed by a nearly even balance of woody species (10%) and forbs (15%). With moderate continuous season long grazing or extended droughts a transition from HCPC to a Perennial Grass/Big sagebrush state may occur. This state is dominated by cool season grasses but Bluebunch may have decreased and species like Indian ricegrass would be a minor component and be in protected areas only while species such as carex spp., blue grama and cactus would have increased. The state has a hydrologic, soil, and biotic community that is stable and intact. From this state, with frequent and severe grazing, lack of fire, extended droughts or a severe grazing in conjunction with wildfire the vegetative state can be converted to a big sagebrush/bare ground community or a threadleaf sod community.

States beyond the Perennial grass/Big sagebrush community are likely to have a biotic, soil, and hydrologic function that is at risk or not functioning. Herbaceous production will decline, the undesirable species increase as the desirable species decrease, and the ability to move towards HCPC is diminished without mechanical treatments, reseeding efforts, soil remediation efforts, and intense grazing management.

The data collected at this site indicates that this site has characteristics of a Big sagebrush/bare ground community. The attribute rating justification for the Biotic Integrity at this assessment was "Moderate." The functional/structural groups are lacking in the correct species. The dominant cool season grass is sandberg bluegrass-needleandthread grass was nearly absent and indian ricegrass was not documented on site. The forbs were

primarily annuals and not representative of the ESD descriptions. The main woody species on site is sagebrush and it makes up a larger than expected part of the community. The percent litter was within expected but it appears that is a direct result of the large amount of sagebrush on site-the litter is not of a kind that should be expected on site-from grasses. The amount of bare ground also is within the upper end of that which could be expected for the site but the areas of bare ground are large and often connected between sagebrush plants-yielding a connectivity. The invasive plants indicator number 16 was rated as moderate-extreme because of the amount of cactus present and found within the transect and the large areas of cheatgrass found throughout the range site. The cheatgrass is not being found within disturbed areas but actually dominates smaller polygons within the range site polygon.



**Section 21**

### **Bull Pasture**

This transect was compared to the Shallow Sandy 10-14 inch precipitation zone (R032XY366W Y). The Historic Climax Plant Community for this ecological site is a Indian ricegrass/Bluebunch plant community. This community would be dominated by cool season grasses (75%) followed by a nearly even balance of woody species (15%) and forbs (10%). With moderate continuous season long grazing or extended droughts a transition from HCPC to a Perennial Grass/Mixed Shrub state may occur. This state is dominated by cool season grasses but Bluebunch, Indian ricegrass and winterfat have decreased. Plants such as sedges, blue grama and cactus would have increased. The state has a hydrologic, soil, and biotic community that is stable and intact. From this state, with frequent and severe grazing, lack of fire, extended droughts or a severe grazing in conjunction with wildfire the vegetative state can be converted to mixed shrub/blowout dune community or a threadleaf sedge sod community.

States beyond the Perennial grass/Mixed shrub community are likely to have a biotic, soil, and hydrologic function that is at risk or not functioning. Herbaceous production will decline, the undesirable species increase as the

desirable species decrease, and the ability to move towards HCPC is diminished without mechanical treatments, reseeding efforts, soil remediation efforts, and intense grazing management.

The data collected at this site indicates that this site has characteristics of a Threadleaf sedge sod community. The attribute rating justification for the Biotic Integrity at this assessment was "Moderate." The functional/structural groups are lacking in the correct species. The dominant cool season grass is sandberg bluegrass with the warm season grass of bluegrama following in frequency. Needleandthread grass is a minor component and indian ricegrass was not documented on site. No forbs were documented within the transect-there were forbs such as scarlet globemallow, segolilly, annuals, and larkspur noted in the area. The main woody species on site is sagebrush and it makes up a community component slightly less than expected for the site. The percent litter and the amount of bare ground was within expected. The invasive plants indicator number 16 was rated as moderate-extreme because of the amount of cactus present and found within the transect and the large areas of cheatgrass found throughout the range site. The cheatgrass is not being found within disturbed areas but actually dominates smaller polygons within the range site polygon.



**Bull Pasture**

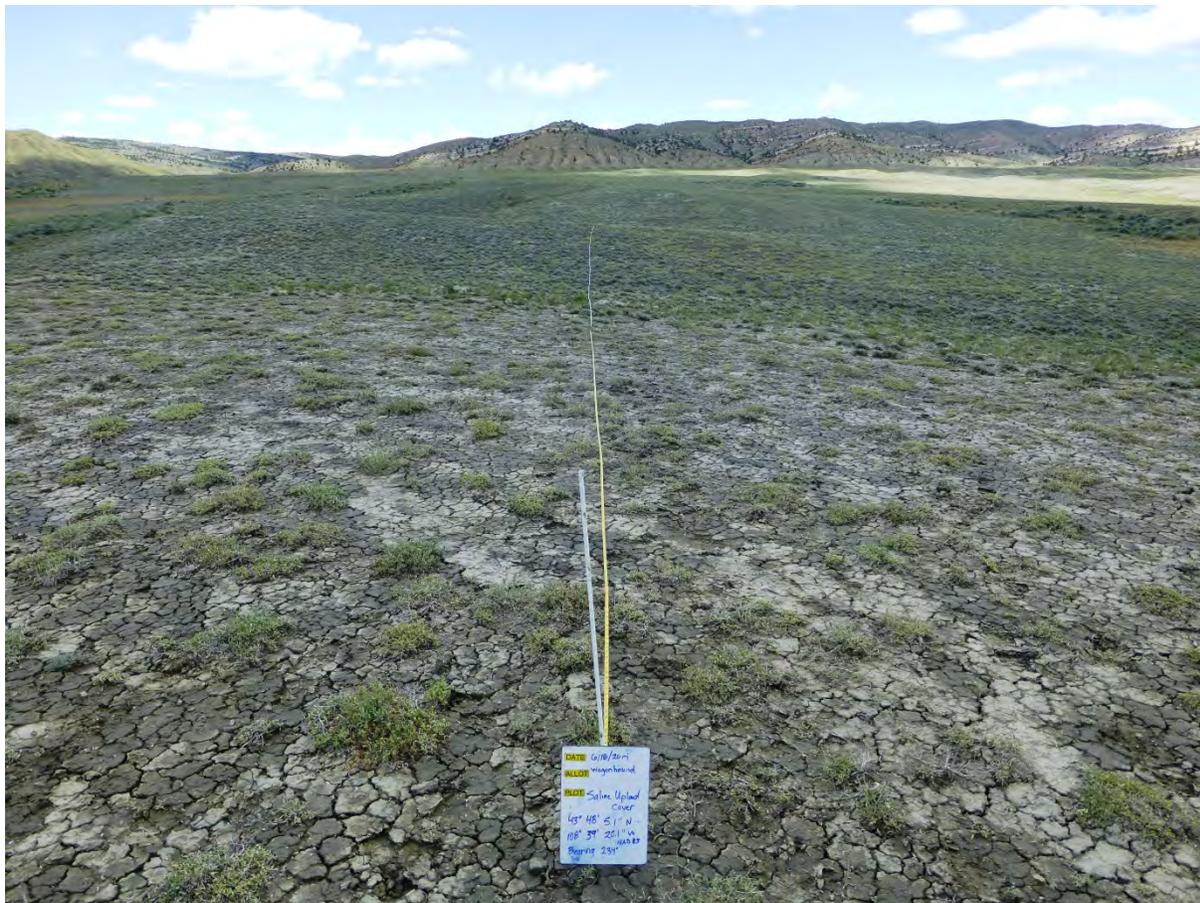
### **Saline Upland Cover**

This transect was compared to the Saline Upland 10-14 inch precipitation zone (R032XY344W Y). The Historic Climax Plant Community for this ecological site is a Gardner saltbush/Indian ricegrass/Bottlebrush squirreltail plant community. This community would be dominated by Gardner saltbush and grasses such as Indian ricegrass, bottlebrush squirreltail, and wheatgrass species. There should be a split of about 40% woody species, 50% grasses and 10% forbs. This state tolerates drought well but it is a fragile state that once damaged is difficult to re-establish. With moderate continuous season long grazing from HCPC to a Gardners saltbush/wheatgrass community. This state is dominated by cool season grasses and gardners saltbush but Indian ricegrass and winterfat have decreased.

Plants such as cactus and birdsfoot trefoil would have increased. The state has a hydrologic, soil, and biotic community that is stable and intact. From this state, with frequent and severe grazing the vegetative state can be converted to mixed shrub/blue grama community or gardners saltbush/bare ground community.

States beyond the Gardners saltbush/wheatgrass community are likely to have a biotic, soil, and hydrologic function that is at risk or not functioning. Herbaceous production will decline, the undesirable species increase as the desirable species decrease, and the ability to move towards HCPC is diminished without mechanical treatments, reseeding efforts, soil remediation efforts, and intense grazing management.

The data collected at this site indicates that this site has characteristics of a Gardner's saltbush/bare ground community. The attribute rating justification for the Biotic Integrity at this assessment was "Moderate to Extreme." The functional/structural groups are lacking in the correct species. The dominant plants on site are Birdsfoot trefoil, Gardner's saltbush, and cactus. Indian ricegrass is a minor component on site and few forbs were documented within the transect. The percent litter and the amount of bare ground were rated at moderate to extreme and extreme-the bare ground was 71% and the amount of litter was only 10%. The invasive plants indicator number 16 was rated as none-slight and within what would be expected.



**Saline Upland**

## Other Photo locations



A photo from a high point in section 28 (private land) overlooking to the WNW over public lands. Bluebunch wheatgrass dominated site.



Photos from Section 21 top photo looking east and bottom looking to the northwest. Bluebunch wheatgrass dominated sites.



An ephemeral drainage in section 5-looking downstream. Adjacent to blue grama/cactus dominated areas. Within the drainages there is a variety of species such a wheatgrasses, needleandthread, cheatgrass, greasewood, sagebrush, swainsons pea, Russian knapweed, annual mustards, salt cedar, sandberg bluegrass, cactus, blue grama and an occasional cottonwood. These sites exhibit instability in soils and an undesirable vegetative components.

**Farmed Acres**

The farmed area of the allotment occurred in 1967. At that that time the purpose was to have contour furrowing/seeding to control runoff into the Cottonwood Creek drainage by improving vegetative cover. The area was farmed and seeded with crested wheatgrass (82%), western wheatgrass (6%), green needle grass (6%), Russian wildrye (3%), alfalfa (2%), and indian ricegrass (1%) at a rate of 8 pounds per acre.

The monitoring completed in 2014 showed that the dominating species on site was sage brush, crested wheatgrass, blue grama, and sandberg bluegrass. Green needle grass, Indian ricegrass, alfalfa, and wildrye were not found in the transect. However, there was a small amount of western wheatgrass encountered. Vegetation as a whole made 21% of the cover in the area, litter accounted for 42 percent of cover and bare ground was observed as 22%. The area doesn't represent a native vegetative community and cannot be compared to the ESD's developed for the area. The site does have evident furrowing and a dominance of non-native plants. It also appears to have a stable soil stability rating in that there was an average rating of 3.7. This area accounts for approximately 750 acres of public lands within the allotment.



Farmed Acres – located in primarily sections 8 and 9.

### 3.5 Wildlife Habitat

Below is a summary of sage-grouse lek data for leks in the vicinity of Wagonhound allotment, and transect photos and summary of the three sage-grouse habitat assessment transects located within representative sage-grouse habitat in the allotment, (see Wildlife Map for transect locations). These were run during the growing season of 2014, to

determine and record the sagebrush canopy cover, shrub height, shrub age diversity and composition, and all other vegetation cover class composition and height.

Sage-grouse Lek Data Summary for leks within 7 miles or less of Wagonhound Bench Allotment:

Lek (C-Core Area)	Average Male Attendance	Peak Male Count & Yr	Low Male Count & Yr	Years of Monitoring
Wagonhound Cr 1 (C)	22	45 in 2009	10 in 2007	22
Cottonwood	4	20 in 1983	0 in 1996	12
Wagonhound 2 (C)	8	18 in 2010	0 in 2013	5
Putney Mine (C)	11	39 in 2006	0 in 1993	21
Kester Coulee (C)	4	19 in 1992	0 in 2006	18

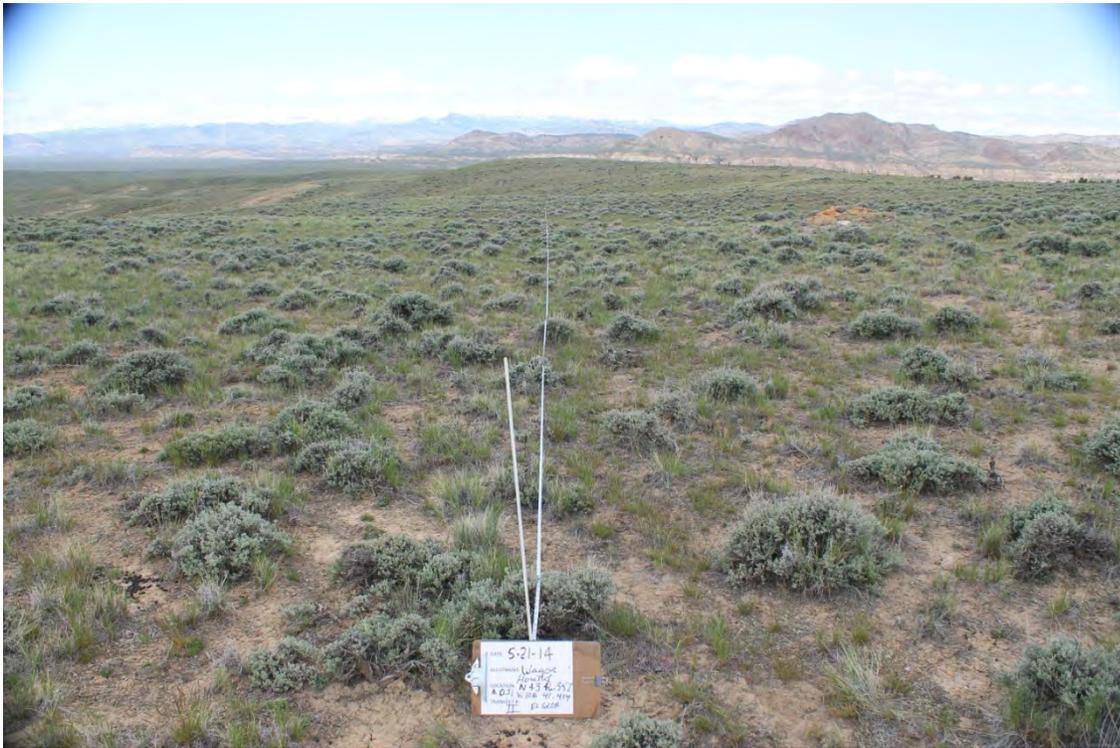
Sage-grouse Habitat Assessment Transects for Wagonhound and Wagonhound Bench Allotments, 5/21–28/2014:

Line Intercept Canopy Cover					
	Wagonhound Allotment			Wagonhound Bench Allotment	
	Transect 029 (Core Area)	Transect 031 (Core Area)	Transect 033 (Core Area)	Transect 035 (Core Area)	Transect 037 (Core Area)
Shrub Species					
Live Big Sagebrush	20	14	8	17	19
Dead Big Sagebrush					5
Other SPP: (Fringe sage)	.4				
Other SPP: (Shadscale)					1.5
Other SPP: (R Rabbit B)					1.7
Shrub Height (inches)					
Live Big Sagebrush	7.9	5.8	7.9	11	6.6
Other SPP: (Fringe sage)	1				
Other SPP: (Shadscale)					6.7
Other SPP: (R Rabbit B)					11
Belt Transect					
Species	Transect029	Transect031	Transect033	Transect 035	Transect 037
Big Sagebrush					
% Young		7	6	18	24
% Mature	73	83	48	65	50
% Decadent	16	8	26	13	20
% Dead	6	1	20	4	6
Daubenmire Cover Class & Vegetation Height Data					
Summary of Vegetation Height (inches)	Transect 029	Transect 031	Transect 033	Transect 035	Transect 037
New Herbacious Mean Height	10	7.2	5.7	7.2	6
Residual Herbacious Mean Height	1	1	1.6	1.6	2
Summary of Cover Class %					
New Perennial Grass	11	19	14.1	10	6.6
New Annual Herbacious	T	0	2.5	T	2.5
Perennial Forb	0	2.5	2.5	2.5	0
Residual Herbacious	1.6	2.5	7	2.5	15
Other	45.25	49.7	85.7	86.5	77.2
Browse Utilization					
Species	Transect029	Transect 031	Transect033	Transect 035	Transect 037
ATTR	Moderate	Low	Moderate	Moderate	Moderate
Rabbit brush					High



Figure 2

Sage-grouse habitat assessment transect 029



Sage-grouse habitat assessment transect 031



Sage-grouse habitat assessment transect 033

## 4.0 Conclusions

This section draws conclusions and makes determinations regarding:

- A. Progress towards or attainment of the standards for rangeland health, and
- B. Whether livestock management is in conformance with the guidelines, and
- C. Whether existing grazing management or levels of grazing use are significant factors in failing to achieve the standards or conform to the guidelines.

### 4.1 Standard 1

*Within the potential of the ecological site (soil type, landform, climate, and geology), soils are stable and allow for water infiltration to provide for optimal plant growth and minimal surface runoff. MET*

#### **Rationale:**

In all six of the 17 indicator monitoring locations the overall rating for the soils was slight to moderate or a none to slight departure from reference conditions. There were no signs of excessive soil loss, erosion, degradation, in the interspaces and underneath plant canopies. The soils are currently supporting their respective ecological sites given the land form and geology of the allotment. Runoff does not appear to be excessive and proper infiltration for plant growth as defined above is occurring.

<b>Land Health Reporting Categories</b>	<b>Acres</b>
Public Land <b>Achieving</b> Standard 1	8125
Public Land <b>Not Achieving</b> Standard 1	0
Public Land where Land Health Standard 1 <b>Does Not Apply</b> or unevaluated (manmade disturbances)	44
Total Public Land Acres	8170

All acres 1 Met, SIG FCTR N/A

#### **4.2 Standard 2**

*Riparian and wetland vegetation has structural, age and species diversity characteristic of the state of channel succession and is resilient and capable of recovering from natural and human disturbance in order to provide forage and cover, capture sediment, dissipate energy, and provide ground water recharge. **Not applicable***

**Rationale:**

There are no naturally occurring riparian areas or wetlands within the allotment on public land that have been documented, verified, and monitored therefore this standard is not applicable.

#### **4.3 Standard 3**

*Upland vegetation on ecological site consists of plant communities appropriate to the site which are resilient, diverse, and able to recover from natural and human disturbance. **MET / NOT MET***

**Rationale:**

Based on the assessment of the data collected as well as observations throughout the allotment, the following table summarizes the number of acres that were determined to meet Standards, the number of acres that were determined to not meet Standards, and the number of acres that no determination was made. This table is also visually represented in the map at the end of the document.

<b>Land Health Reporting Categories</b>	<b>Acres</b>
Public Land <b>Achieving</b> Standard 3	5308
Public Land <b>Not Achieving</b> Standard 3	2741
Public Land where Land Health Standard 3 <b>Does Not Apply</b> or Unevaluated (reservoirs/manmade/badlands-rock outcrops)	122
Total Public Land Acres	~8171

**RATIONALE-MET:** As it pertains to the acres that did meet the standard, these sites are in a dynamic equilibrium with the Historic Climax Plant Community. This means that at this time these sites have appropriate pathways available to them to respond to proper grazing strategies, favorable environmental conditions, and environmental disturbances. The sites have a vegetative community that is stable, intact, resistant to change, and provides for soil and watershed stability.

**RATIONALE-NOT MET:** Acres that were determined to have not met the standard are those that have had a significant change or shift from the potential of the site and do not have an appropriate plant community capable of recovering or returning to a functional community without mechanical treatments, seedings, intensive grazing management, etc. These sites have little capability or probability of returning to a more desirable state.

Overall the standard is not met on these acres due to the loss of or reduction of functional structural plant groups. Grazing has not been permitted on the public lands for approximately a decade therefore the determination that current grazing management attributed to the current range conditions can't be made. In fact, a review of the record indicates that the allotment was stocked heavier than the most recent grazing permit. Also, it shows that the majority of acres were comprised of a community of species that even today would not meet standard 3 (AMP, 1968). Given this data it could be stated that historical grazing use attributed to the current range conditions. Also, at that time it was stated that prior to 1968 the estimated carrying capacity was 1,726 AUMs and under the actions of the AMP the allotment had the potential of 2,532 AUMs at 65% utilization levels. The most recent permit allowed for 820 AUMs so in the 1960's the allotment was determined to carry 210% to 308% more AUMs.

Based on the assessment of the data collected as well as observations throughout the allotment, the following table summarizes the number of acres that were determined to meet Standards, the number of acres that were determined to not meet Standards, and the number of acres that no determination was made. This table of acres is also visually represented in the map at the end of the document.

#### 4.4 Standard 4

*Rangelands are capable of sustaining viable populations and a diversity of native plant and animal species appropriate to the habitat. Habitats that support or could support threatened species, endangered species, species of special concern, or sensitive species will be maintained or enhanced. MET/NOT MET (see rationale)*

<b>Land Health Reporting Categories</b>	<b>Acres</b>
Public Land <b>Achieving</b> Standard 4	5308
Public Land <b>Not Achieving</b> Standard 4	2741
Public Land where Land Health Standard 4 <b>Does Not Apply</b> or Unevaluated (reservoirs/manmade/badlands-rock outcrops)	122
Total Public Land Acres	~8171

#### **RATIONALE:**

Ten monitoring locations were chosen in the allotment for monitoring and evaluation purposes. Three of these transects were primarily for sage-grouse habitat assessment, and the other three to measure soil and vegetative parameters for evaluating the 17 Indicators of Rangeland Health. The sage-grouse habitat assessment transect locations were in the west central, east central, and southeastern portions of the allotment. All were intentionally located in representative sage-grouse habitat in the allotment with gentle topography and larger continuous

sagebrush communities (see Wildlife Habitat Resources map for transect location). The other seven monitoring locations where the 17 Indicators of Rangeland Health were assessed were more representative of the allotment in general. Sagebrush canopy cover measured at sage-grouse habitat assessment transects were 20, 14 & 8%. In addition to the wintering has been documented, some level of sage-grouse nesting and early brood rearing is likely occurring also, at least within suitable habitats. Sagebrush canopy cover within sagebrush stands used for nesting generally ranges from 15 to 25%, and winter habitat is generally defined as sagebrush stands with 10-30% canopy cover (Connelly et al. 2000a).

**MET:**

As was mentioned above in the rationale for Standard 3, four of the seven Rangeland Health monitoring sites; T438, 447A, 447 B, and 3x3 Section 30 were all best described as a Perennial grass/Mixed Shrub plant community. These communities still retain appropriate pathways available to respond to favorable environmental conditions, and environmental disturbances, and are stable, intact, resistant to change, and provides for soil and watershed stability. The Biotic Attribute of Rangeland Health for all 4 of these monitoring sites was rated at “None to Slight”, and this plant community maintains enough diversity and dominance by desirable perennial grasses to return to HCPC. This community also provides for a diversity of plant species including an overstory of sagebrush and understory of bunchgrasses and forbs, and in turn provide for the diversity of wildlife habitat needs like cover, forage and nesting habitats. Most importantly these vegetation communities provide a diversity of native plant species that in turn provide for a diversity of animal species, of which all are appropriate to the habitat, and therefore do meet Standard 4.

**NOT MET:**

The remaining three Rangeland Health monitoring sites were; Section 21, Bull Pasture and Saline Upland. These sites were found to best be described as a Big Sagebrush/Bare Ground, Thread leaf sedge sod, and Gardners Saltbush/Bare Ground plant communities, respectfully. These communities are characterized as being sites where invasive species, including Blue Grama and Prickly Pear, have either taken over the site, and/or sites where the desirable perennial grasses have been lost from the plant community. Also all three had the Biotic Attribute of Rangeland Health rating from “Moderate” to “Moderate – Extreme” for these sites, meaning that they have at least moderately departed from what the potential Historic Climax Plant Community (HCPC) is for the site. These plant communities exhibit a low level of plant diversity and therefore do not provide for a diversity of wildlife habitat needs in the form of cover, forage, or nesting habitat. And most importantly these vegetation communities contain invasive species that are not appropriate for their habitats, and compete with native plant species for space and resources and in turn do not provide for a diversity of animal species, and for these reasons do not meet Standard 4.

## **4.5 Standard 5**

*Water quality meets State standards. Met*

**Rationale:**

The use classifications defined (WYDEQ, 2001) for the drainages in the allotment are considered to be Class 2AB waters.

Class 2AB streams are those surface waters known to support game fish populations or spawning and nursery areas at least seasonally and all their perennial tributaries and adjacent wetlands and where a game fishery and drinking water uses are otherwise attainable. Such waters are additionally protected for nongame fish, fish consumption, aquatic life other than fish, primary contact recreation, wildlife, industry, agriculture, and scenic value (DEQ,2001).

Many studies have documented the effects of heavy grazing on riparian vegetation and soil erosion rates, but few studies have directly assessed impacts on water quality. Potential management impacts to water quality from rangelands as outlined in (Binkley, 1993) such as: excessive livestock waste production, resource extraction, stream channel modification, bank erosion from floods, erosion following wildfires, or erosion from overgrazing are elements to consider as possible non-point source impacts to water quality. The allotment was reviewed for these types of impacts and none were identified as a causal factor for this standard.

However currently within the assessment area, water quality impairment has not been identified in any water bodies by the State of Wyoming the appropriate TMDL's have been established. The UAA performed by the DEQ have determined that the appropriate beneficial uses are currently being met for this section of Cottonwood Creek and its tributaries in the allotment.

#### **4.6 Standard 6**

*Air quality meets State standards. UNKNOWN*

##### **Rationale:**

No information is currently available to indicate that this Standard is or is not being met. An air quality monitoring station was recently established in the Bighorn Basin, but no monitoring data is available at this time. Until specific data becomes available, the determination for this Standard is UNKNOWN, per direction from the BLM Wyoming State Office.

#### **4.7 Guidelines for Livestock Grazing Management**

Guidelines provide for, and guide the development and implementation of, reasonable, responsible, and cost-effective management practices at the grazing allotment and watershed level. These management practices will either maintain existing desirable conditions or move rangelands toward statewide standards within reasonable timeframes. Appropriate guidelines will ensure that the resultant management practices reflect the potential for the watershed, consider other uses and natural influences, and balance resource goals with social, cultural/historic, and economic opportunities to sustain viable local communities. ~~**COMPLIANT/NOT COMPLIANT**~~

##### **RATIONALE:**

To state that current management is the possible cause of acres not meeting a standard or not in compliance with the Guidelines cannot be made as there is no active grazing permit and has not been for approximately a decade. See standard 3 for description of range conditions prior to the current range conditions as well as a brief description of past grazing practices.

**5.0 Resource Specialist Signatures**

X

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X

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John Elliott  
Supervisory Rangeland Management Specialist

X

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Tim Stephens  
Wildlife Habitat Biologist

X

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Jared Dalebout  
Hydrologist

X

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Michael J. Phillips  
Assistant Field Manager - Resources

## 6.0 DETERMINATION

*Based on information provided in this assessment, I have determined that standard 1 is being met, standards 2 is not applicable, standards 3 and 4 are being met in part, and standards 5 is met and and 6 is unknown. I have determined that the acres that do not meet standard 3 are not due to the current livestock use.*

X  X

JUN 08 2015

Rebecca Good

DATE

Worland Field Manager

## 7.0 Factors related to nonconformance with standards:

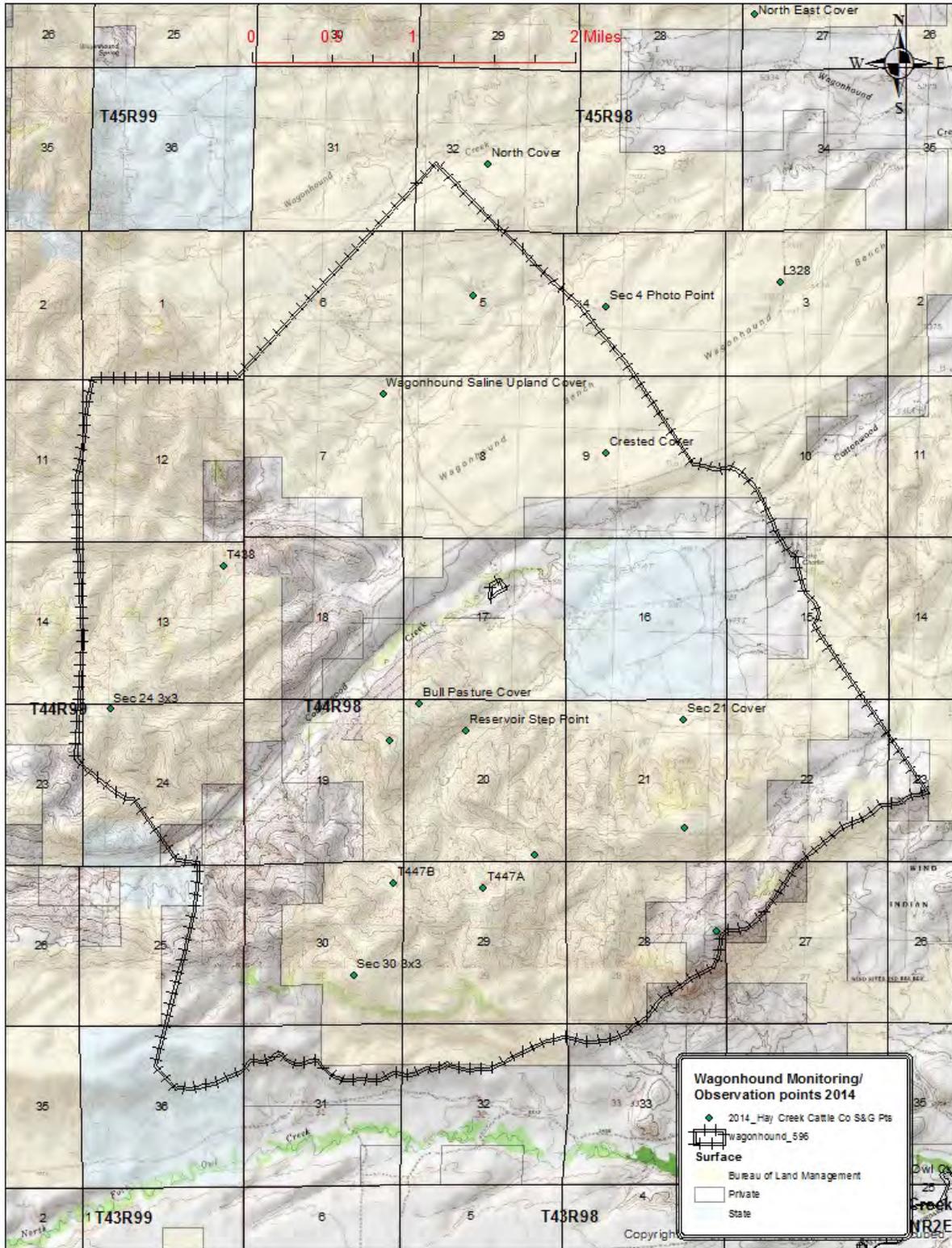
The historic grazing use as described above in combination with the aggressive and opportunistic nature of invasive plants is determined to be the causal factor for acres not meeting the standard.

## 7.0 REFERENCES

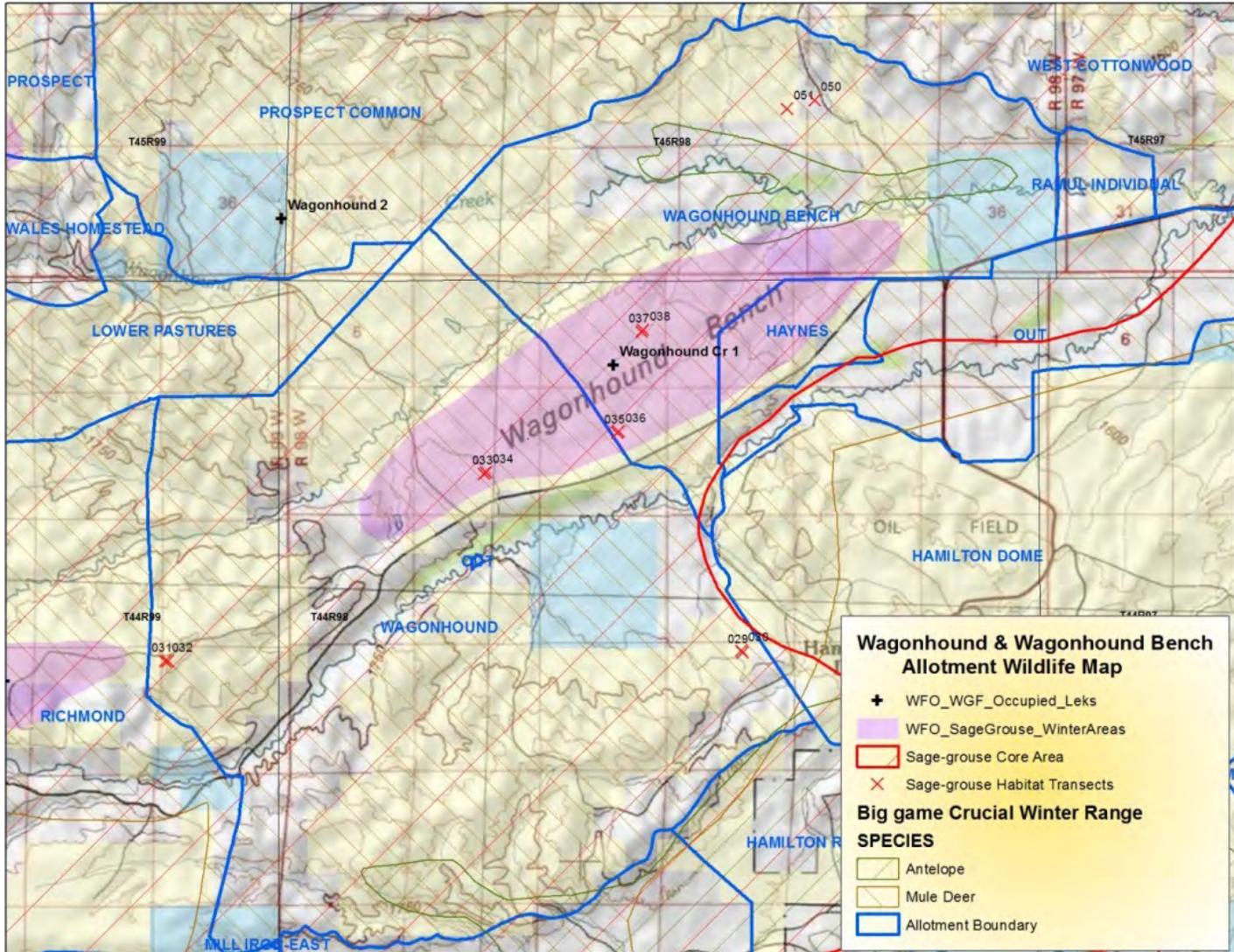
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Wyoming DEQ 2012 305b Report

Appendix

Map: Allotment Map (Not to Scale)



**Map: Wildlife Habitat Resources**



**Map: Upland Vegetation Standard Conformance (Standard 3)**

